

Claims

1. A planar antenna array in a radar sensor for detecting objects in the vicinity of a motor vehicle, with a multitude of microstrip feeder lines (18) and a multitude of coupling slots (20) for emitting microwave energy into open space, characterized in that

- the feeder lines (18) and the coupling slots (20) are embodied in a multilayer ceramic substrate (10) produced by means of the LTCC thick layer technique with an upper (12) and a lower grounded layer, and

- the feeder lines (18) and coupling slots (20) are enclosed by plated-through contacts (14) from the upper grounded layer to the lower one.

2. The antenna array according to claim 1, characterized in that the feeder lines (18) and coupling slots (20) are surrounded at a fixed distance by plated-through contacts (14), the distance being smaller than a critical distance at which waveguide modes form.

3. The antenna array according to claim 2, characterized in that the fixed distance lies in the range from approx. $0.01 * \lambda$ to approx. $0.1 * \lambda$, where λ is the wavelength of the microwave radiation emitted.

4. The antenna array according to one of claims 1 to 3, characterized in that each coupling slot (20) is enclosed by a single-row arrangement of plated-through contacts (14; 30; 40, 42).

5. The antenna array according to one of claims 1 to 3, characterized in that each coupling slot (20) is enclosed by a double-row arrangement of plated-through contacts (36, 38), wherein the two rows are aligned with each other or offset from each other.

6. The antenna array according to one of the preceding claims, characterized in that the distance of the coupling slots (20) from the end of the resonator is essentially $(2n-1) * \lambda/4$, where λ is the wavelength of the emitted microwave radiation and n is a natural number.

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7. The antenna array according to one of the preceding claims, characterized in that the distance of the coupling slots (20) from the back wall is essentially $2n * \lambda/4$, where λ is the wavelength of the microwave radiation emitted and n is a natural number.

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8. The antenna array according to one of the preceding claims, characterized in that the plated-through contacts (30, 36, 38) enclose the coupling slots (20) along an essentially rectangular perimeter line, wherein the distance of the coupling slots (20) from the edge of the plated-through contacts (30, 36, 38) is preferably essentially $2n * \lambda/4$ perpendicular to the slot direction, where λ is the wavelength of the microwave radiation emitted and n is a natural number.

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9. The antenna array according to one of the preceding claims, characterized in that the plated-through contacts (42, 46) enclose the coupling slots (20) along a perimeter line that bulges in the middle of the slots, wherein the distance is greater than $2n * \lambda/4$ in the middle of the slots and is less than $2n * \lambda/4$ outside the middle, where λ is the wavelength of the microwave radiation emitted and n is a natural number.

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10. The antenna array according to one of the preceding claims, characterized in that the plated-through contacts (48, 50) enclose the coupling slots (20) along a perimeter line with rounded corners.

11. The antenna array according to one of the preceding claims, characterized in that two rows of plated-through contacts are provided spaced apart from each other by the distance of half a wavelength.